

A free world education eBook

CASEBOOK

OF

BIBHAS DE

THE HEAVENWARD DIVINING ROD

A COMPENDIUM ON THE LIGO
GRAVITATIONAL WAVE OBSERVATORY
INSTRUMENTATION FRAUD

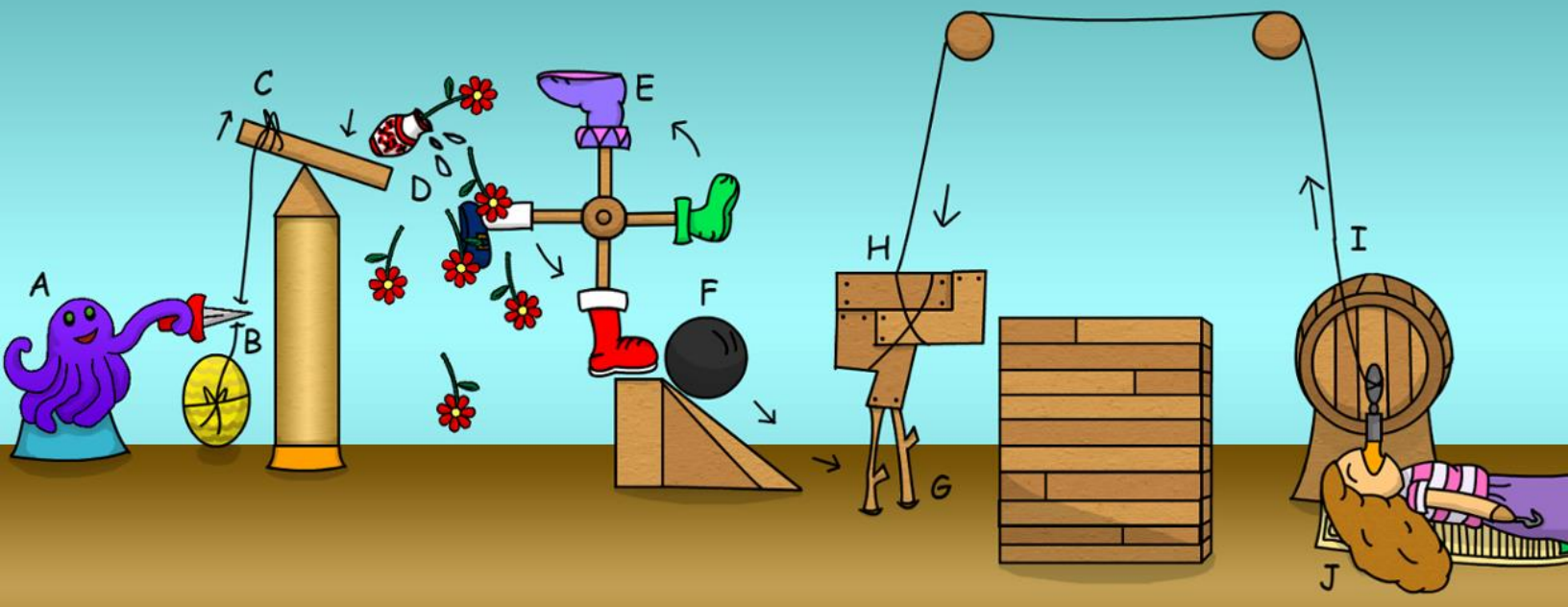
The billion-dollar LIGO is as worthless an instrument as a \$44.99 cure-all pure-copper magnetic bracelet.

But mighty forces stand behind LIGO with their generous coffers: The governments of USA, Australia, Germany, India, Italy, Japan and UK.

LIGO marks the end of your scientific civilization.

A pod lies in readiness for everyone.

01/28/2019



Rube Goldberg

LIGO INSTRUMENT PHILOSOPHY

Instrument philosophy? That sounds a little overblown. But not when it comes to LIGO. Like all other advanced instruments of scientific discovery, LIGO of course has an instrument operating principle. But for LIGO, there have been added to this other operating elements: processes and procedures that exceed the boundaries of conventional physics; logic that strains conventional idea of logic; and when it comes to the Ligonauts, a cult-like cohesion, a CIA-like secrecy, a Madison Avenue-like media-mindedness, and an Area 51-like discouraging of interlopers. All this taken together can be described as an overall instrument philosophy.

This philosophy is necessary because the science cannot cut it. There needed to be stagecraft and atmospherics, painted-face clowns and magician's assistants, videos and animations.

LIGO cannot detect gravitational waves not because of low sensitivity, signal-to-noise problems, faulty data analysis procedure etc. LIGO is not designed to detect gravitational waves on the sky any more than a divining rod is designed to detect water or minerals in the subsurface. LIGO can neither be upgraded nor redesigned. It can be salvaged as scrap metal.

INSTRUMENTATION FRAUD

SEVEN PILLARS OF LIGODOM

The multifaceted absurdity of the discoveries

- I. BOOTSTRAP
 - II. SELF-VALIDATING DISCOVERY LINK
 - III. WAVE WAIVE
 - IV. "SPECIAL" RELATIVITY
 - V. DEEP DISCONNECT
 - VI. QUANTUM CERTAINTY
 - VII. FAKE CHIRP
- ENGINEERING BOTCH-UP

"... the precision of the conclusions increasing as the ignorance or stupidity grows. "

Claes Johnson, Professor of Applied Mathematics, Royal Institute of Technology, Stockholm, Sweden (on the day the first LIGO discovery was announced.)

I. BOOTSTRAP

In connection with the LIGO discovery one has often heard the phrase “direct detection of gravitational wave.” Perhaps this is to contrast LIGO from past indirect detection. However, LIGO is anything but direct detection. Such detection was precisely what was avoided, skirted around, and danced around.

That left the Ligonauts with a bootstrap mechanism for “detecting” the wave.→

LIGO FRAUD EXPLAINED IN PLAIN TEXT

So Kip Thorne makes two independent theoretical assumptions on the sky: (T1) Models of merging black holes; (T2) Emission of gravitational waves (GW) therefrom. Rainer Weiss makes two independent (of each other, and of T1 and T2) experimental assumptions on the ground: (W1) Two mirrors ~ 6 km apart move in invisible entanglement when GW passes by; (W2) Movements of the mirrors smaller than Heisenberg uncertainty can be measured as precision macroscopic lengths. All in all, we have four independent assumptions to validate before we can talk of a discovery.

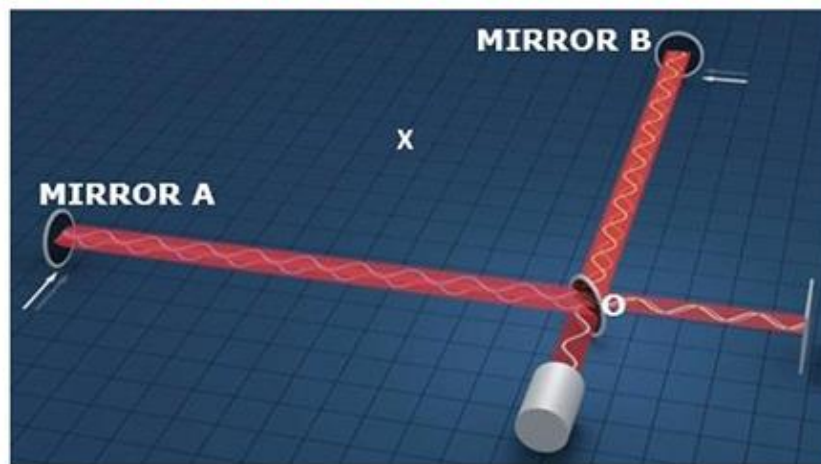
Kip whips out his sky wiggles and emails them to Rai. Rai fires up his machine and presto, those sky wiggles appear at the readout of his computer. Gravitational wave *is discovered*, because this wiggle match is said to implicitly validate all four independent assumptions T1, T2, W1 and W2. But how? Mr. GW must have somehow whispered into the ears of Kippy Boy and Raister his travel tales of how, as he was making his trek from his birthplace to the LIGO readout, has experienced all the four effects along the way. Every unknown and unknowable (and highly questionable) effect invoked to make the discovery possible now stands attested to by the discovery itself! A kind of Jedi bootstrap? Or a Zen one-handed clap?

If any one of the four assumptions fails (so far none is validated), **LIGO readout can contain nothing about any GW**. But all this is academic anyway. Because the size of LIGO is infinitely small compared to the wavelength of the alleged GW, even an idealized LIGO (without any noise) is scientifically incapable of sensing GW, much less of reproducing the sky wiggle at its readout. That's just unavoidable basic physics. By this, **LIGO readout can contain nothing about any GW**. So, in slyly engineering the uncannily perfect wiggle match, the over-clever boys actually shot themselves in the foot. This match itself is the most telling evidence of fraud. This match is also what led to the Nobel Prize in Physics in 2017. Lord have mercy!

Duty to Inform

Bibhas De 10/10/2018

LIGO INSTRUMENT IN-DEPTH



The LIGO instrument is about measuring the horizontal displacements of the two freely hung mirrors A and B as a gravitational wave (GW) passes by, relative to the stationary reference frame of the instrument before the wave arrived. In conventional physics this displacement is indeterminate. Consider any arbitrary point X anywhere in the LIGO universe where you stand with a Laser Distance Measurer. Can you measure in real time the movement of the two mirrors? No, because you are also moving when the GW is passing by.

This is where Nobelist Rainer Weiss's legendary genius of measuring the *difference* in the displacements of the two mirrors comes in. The method works in the interferometer because of the GW theory that as one mirror moves towards O, the other moves away from O. The two mirrors move antisynchronously. A nonzero phase shift $\Delta\phi$ results between the two laser beams returning to the detector O from the two mirrors. The legendary boo-boo with this technique is that you can never demonstrate this antisynchronicity which is not a given but something *for the experiment to prove*. You cannot prove this because of what I said in the preceding paragraph. Any physicist who believes in *The Raister Bootstrap* is a loser.

Duty to Inform

A world education message from Bibhas De 01/07/2019

HOW DID LIGO EVEN PASS THE SMELL TEST?

The LIGO instrument produces output signals (wiggles) due to a wide variety of terrestrial reasons, and these signal-producing instrumental mechanisms have absolutely no relationship to how LIGO allegedly works when an alleged cosmic gravitational wave passes by. As the Ligonauts have clearly stated:

“Many non-gravitational signals can move the mirrors or affect the laser light in a way that can mimic or mask a gravitational wave signal.”

So the LIGO instrument has basically two classes of operation (as to the detailed mechanism of producing a signal):

CLASS A OPERATIONS: Non-gravitational wave modes of operation.

CLASS B OPERATION: Gravitational wave mode of operation.

LIGO CLASS B OPERATION

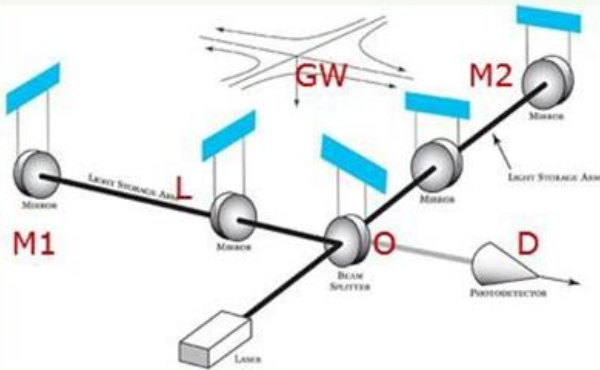
- (1). Both mirrors “move”;
- (2). They move axially only;
- (3). They move to the extent of $1/10,000^{\text{th}}$ of the proton diameter;
- (4). The motions of the two mirrors are entangled;
- (5). Laser functioning is not affected (it is as ideal as prescribed).

The above five *conjectured effects* occur within the sealed LIGO tube and are not monitored by the experiment to see if they *actually take place*. However, when a telltale “discovery wiggle” is observed at the output, it is said to experimentally prove: (i) a gravitational wave has passed by; and (ii) it has done all of the above five things while passing by. With this kind of boiler-room scamming talent you could bottle possum’s pee as Chanel No. 22.

Note that the near-simultaneous observation of the wiggle at the two LIGO stations *does not* indicate a gravitational wave exclusively. Rainer Weiss shot down the Joseph Weber discovery with this argument. LIGO has logged many near-simultaneous wiggles that were not identified as gravitational wave.

There is no Class B Operation. It is all common garden Class A.

LIGO INSTRUMENT: THE DEEP ROOTS OF FRAUD



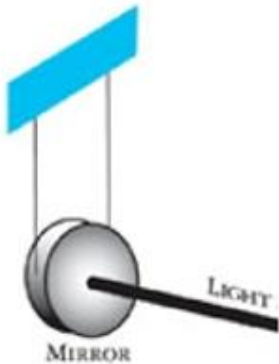
M1, M2: LIGO theory says that when a gravitational wave (GW) rains down vertically, the mirrors oscillate along their axes antisynchronously. This prediction is what LIGO needed to prove to discover GW. Instead, this invisible entanglement is taken as ground truth, and used as the instrument's operating principle. **LIGO is a well-concealed cerebral bootstrap.**

M1-O-M2: Because of the antisynchronicity, the laser runs M1-O and M2-O are predicted to have unequal lengths as they contract and expand during the passage of the GW. However, on the same basis, the laser wavelengths also expand and contract correspondingly – resulting in zero interferometric phase lag between the two runs. Thus **LIGO is not an interferometer (or is a permanently null interferometer.)** The false time lag argument has been shown to be a misrepresentation of General Relativity which is LIGO's vaunted scientific basis.

M1, M2: LIGO has two classes of operation: the predicted antisynchronous mirror motion described above (Class B), and normal random/independent mirror motions (Class A). Nothing in LIGO data proves Class B operation actually materializes. **LIGO is therefore all Class A.** (Motion of a single mirror can generate sinusoidal wiggles.)

L, D: The rate at which laser samples mirror movement does not support the conclusion that the range of numerically-obtained chirp frequencies are all on the sky. **The chirp is either artifactual or comes from non-Class B processes.** It is possible that electromagnetic signals enter the detector directly, past the photodetector D. 01/22/2019

LIGO SCAMORAMA II



This picture shows one of LIGO's freely hung mirrors. The axis of the mirror is also the direction in which the laser beam arrives and is reflected back. This perfect alignment of the two beams with the mirror axis is an absolute requirement for LIGO detecting gravitational waves. However, noise (all effects other than gravitational wave) upsets this situation. Consider:

(A) IDEAL MIRROR ACTUATION: When a gravitational wave arrives, the mirror moves back and forth strictly along the axis. The laser beams remain perfectly aligned with the axis.

(B) MIRROR JITTER: Noise causes the mirror to move in random ways. This causes the beam to become misaligned.

(C) LINK JITTER: Vibration of other structures causes the beam to go off alignment.

(D) LIGO ASSERTION: When a gravitational wave arrives, noise is always present. LIGO assumes that this noise is added to the wave signal, but that the signal retains its identity (integrity) so that the signal and the noise can be separated by digital processing of LIGO readout.

(E) CORRECT PHYSICS: This is wrong. Since noise makes the laser beam veer off-axis, the gravitational wave is being recorded through this misaligned laser link – and not the way it was supposed to be recorded (see A). Noise actually creates an instrument effect to distort the wave signal, and also becomes superimposed on that distorted signal. This distortion is indeterminate. The noise and the wave signal are intrinsically inseparable in the LIGO readout.

(F) WAVE SIGNAL INSIGNIFICANT: Any jitter due to noise is far larger than the quantum-scale mirror movement allegedly caused by the wave. LIGO actively suppresses the wave signal by the above instrument effect. The reports of large signal-to-noise ratios are false. If some wiggle does stand head and shoulder above noise, then *ipso facto* it cannot be gravitational wave.

CONCLUSION: LIGO cannot detect gravitational wave even if the principle of the instrument is otherwise sound. But it is not.

10/25/2017

II.SELF-VALIDATING DISCOVERY LINK

An astronomical observation situation generally involves an instrument (on ground or in space) and some object (heretofore discovered or undiscovered) on the sky to be measured/detected by the instrument.

If the instrument is known and the object is unknown, the instrument discovers/validates the object.

If the instrument (property) is unknown (or to be tested/verified) and the object is known, the latter validates the instrument.

With LIGO, both the instrument and the object are unknown, and they validate each other.

Not only that. An observation validates a whole chain of unknowns in the observing situation that were necessary to make the discovery happen.→

LIGO SCAMORAMA I

ON THE SKY

KIP'S CONJECTURES:

- A. BLACK HOLES MERGE
- B. GRAVITATIONAL WAVES



KIP'S WIGGLE



(compare)

RAINER'S WIGGLE



INSIDE LIGO

RAINER'S CONJECTURES:

- C. MIRROR MOTIONS
ENTANGLED
- D. MACROSCOPIC MOVEMENT
ON QUANTUM SCALE

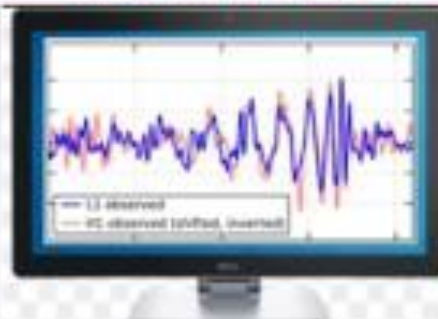
Q: Astronomical discoveries involve a known instrument and an unknown source. LIGO concerns an unknown instrument and an unknown source. Each of the above four independent conjectures must be demonstrated to be correct. LIGO has no way to demonstrate that the uncommon instrument conjectures actually happen. Comparing the above two wiggles is the only test LIGO can perform. Now, if the wiggles do match in detail, which of the four conjectures stand proved?

A: None. One wiggle match cannot simultaneously make a discovery on the sky and validate the unknown discovery instrument on ground. Simply put, two scientific unknowns cannot validate each other.

10/25/2017

THE TRUTH BEHIND LIGO INSTRUMENTATION CONCEPT:
An elaborate storyline, a brief wiggle, and hey presto,
the discovery of the millennium!

THE AMAZING LIGO PEEPSHOW



Imagine a carnival attraction with two sealed peepshow boxes. Only, you cannot peep! Nobody can know what actually goes on inside the box. There is only a very elaborate story the clown tells you about what goes on in there: lights flashing, mirrors moving, pendulum bobs swaying – all in a perfectly choreographed and conducted process. There are cables coming out of the box and going to a computer. The screen of the computer shows a steady stream of wiggles. As soon as the wiggles from the two boxes match and also look like one of a myriad wiggles in the Ligonaut Library, the whole Rube Goldberg-like step-by-step process inside the sealed box stands proved to have actually taken place.

NOBODY is observing what process goes on *inside* the sealed steel pipeline. The endpoint appearance of the matched wiggles on the screen is said to affirm the entire storyline! If you hear a zaftig lady singing in her bathroom, does this prove an entire performance of Mikado has just concluded?

The LIGO discoveries rest 100% on this affirmation of the choreography. Since there is zero experimental evidence for this, and since any disturbance of LIGO is observed to produce wiggles anyway by processes entirely different from the above choreography, there has never been a discovery.

LIGO CORNUCOPIA

THORNUCOPIA

Two little wiggles made so many jingles:

Two little LIGO wiggles proved in one fell swoop the following long chain of *independent, never-before-proven theses* on Earth and on the sky:

KIP THORNE'S BAKER'S DOZEN

1. Both LIGO mirrors move, in antisynchronicity.
2. Quantum-scale movements in the uncertainty range are measurable macroscopic distances.
3. LIGO is properly calibrated (voltage \rightarrow strain).
4. LIGO input waveform is unnecessary to find.
5. Wave physics limitations do not apply to LIGO.
6. Gravitational waves exist.
7. They stretch/squeeze space tensorially.
8. They move at the velocity of light.
9. They weaken as $1/r$.
10. Idealized black holes exist.
11. Binary black holes exist, spiral, upchirp, and ring down.
12. Black hole merger gives off energy.
13. The energy is gravitational wave.

"A bird does not sing because it has an answer. It sings because it has a song." Chinese proverb

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A world education message from Bibhas De 01/26/2019

III. WAVE WAIVE

There are similarities and differences between gravitational waves and electromagnetic waves. However, a gravitational wave is a wave, and certain fundamental aspects of wave behavior apply.

These limitations were never applied or even discussed in developing the LIGO instrument science. Wave physics limitations were waived. →

LIGO PHYSICS FOR YOUR KIDS

OK kids, let's talk about the LIGO discovery machine. Let me explain this in words only – without figures and equations. Imagine a metal cross with two equal arms. Lay it down on a table. Now gravitational wave (GW) comes down on the table. The LIGO machine theory says that, at any given instant of time, the wave compresses one arm and stretches the other arm. So the equal-length arms become of unequal lengths. Let us call this phenomenon *a differential effect*. LIGO reportedly measures the nonzero difference in the two lengths, and from this difference, infers the presence of the GW and deduces its properties.

This theory misses entirely the wave nature of gravitational wave. There are two lengths to be considered: The length of the arm of the cross, and the wavelength of the GW. When the arm length is less than about one-third the wavelength, the cross cannot feel the differential effect. The change in lengths of the arms will be equal, and approach zero.

The basic physics of waves says that when a physical structure encountered by a wave is smaller than about one-third the wavelength, the wave cannot "resolve" the structure. What this means in plain language is that the GW does not see the cross as an oriented two-armed structure, but sees it as a fuzzy dot. In the case of LIGO, the cross is infinitely small compared to the wavelength, and so **LIGO response can contain no information about GW** even if it exists and the theory of the differential effect is correct.

Clearly then, there is no way to salvage the LIGO machine. It is a billion-dollar piece of junk.

LIGO SCAMORAMA XIX

Gravitational Wave and Radio Astronomy

There are similarities and differences between gravitational (GW) and electromagnetic (EM) waves. Nevertheless, the following comments apply to both wave behaviors and their detections.

Q: If a radio astronomer Fred wanted to detect a theorized radiation component around some wavelength λ in the sky, would he build an antenna whose size L is much smaller than λ ($L \ll \lambda$)?

A: Absolutely not! But GW astronomers Kip and Rai did.

Q: If Fred wanted to detect the theorized polarization state of the EM wave, would he build an antenna with $L \ll \lambda$?

A: Absolutely not! But Kip and Rai did.

Q: If Fred is expecting a pulse train and needs to discern the precise arrival time, would he build an antenna with $L \ll \lambda$?

A: Absolutely not! But Kip and Rai did.

Q: If Fred wanted to triangulate the direction of the source in the sky, would he build three antennas where D , the distance between any two antennas, is such that $D < \lambda$?

A: Absolutely not! But Kip and Rai did.

Q: If Fred anticipates that his signal would be buried deep in white noise and masked by other unwanted pulse trains, would he build the hardware anyway?

A: He most likely would not, and most likely would not be funded. But Kip and Rai were funded to do this.

Q: Would Fred be funded to build an unworkable system with $L \ll \lambda$ and $D < \lambda$ because practical considerations of space, resources, state of technology etc. impose this limitation?

A: Absolutely not! But Kip and Rai were.

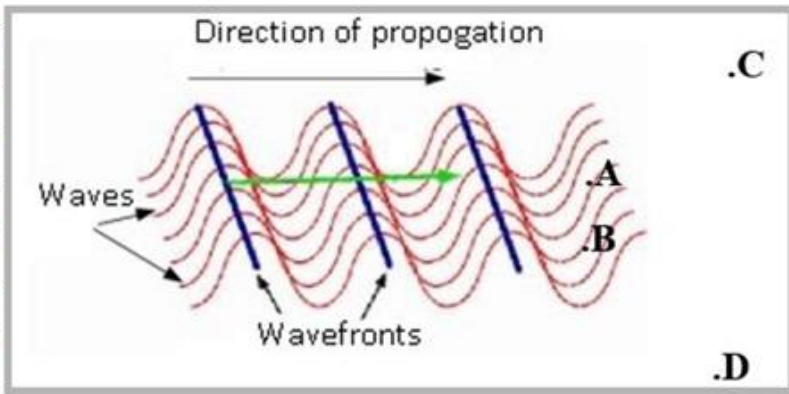
Q: What's exceptional about Kip and Rai?

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A world education message from Bibhas De 02/19/2018

LIGO PHYSICS FOR YOUR KIDS II

OK kids, let's talk more about the LIGO discovery machine. Today we want to talk about *triangulation* – the process by which LIGO determines the direction of a source of gravitational wave (GW) on the sky. LIGO determines the time lags Δt between the arrivals of the GW at three stations on Earth. From these it pins down the direction of the GW.



We discuss a two-station case, but it can easily be extended to 3 stations. Consider the figure. A wave is coming at you, and you have set up two

stations A and B. We assume you know the velocity v of the wave. If you determine that the wave arrives Δt secs later at A than at B, draw a circle around A of radius $v\Delta t$. Now draw a line through B and touching the circle at A (tangential to the circle.) This line is your determined wavefront. You now know the direction of the wave. Do the same with C and D.

Now, as we discussed in the previous lesson, if the distance between two stations is roughly on the order of or smaller than the wavelength, the wave cannot resolve them, i.e. cannot see the two stations as separate locations. So any Δt that you measure will not be the proper time lag. If the station separation is much longer than the wavelength, you are fine to use this technique. AB is no good; CD is OK. LIGO includes the AB situation and cannot triangulate. But this point is irrelevant because LIGO cannot even detect GW.

LIGO SCAMORAMA XVI

THE OCCULT OF THE THORNEWEISS CULT

Let me summarize in one graphic why the LIGO concept for detecting gravitational wave (GW) is a high level quackery from the get go. For this purpose we consider a textbook-idealized LIGO without any noise of any kind. Some unknown impetus produces a signal Δ . We need to identify this impetus as GW. Let

$X(t)$ = "displacement" of LIGO's X-mirror (with sign)

$Y(t)$ = "displacement" of LIGO's Y-mirror (with sign)

$\Delta = X(t) - Y(t)$ = LIGO signal

So a nonzero Δ can arise if one mirror is stationary and the other moves. Or both mirrors move as different functions of time. To identify the impetus as GW, we *must* demonstrate that X and Y are the same function of time, but 180° out of phase. To demonstrate this, we must *independently and simultaneously* measure the values X and Y, referred to one fixed location. This is precisely what LIGO cannot do as a GW passes by. LIGO is designed to never be able to identify GW. This is the end of the story. But let's go on exploring this thousand-genius quackery.

$L_\lambda = L/\lambda$ (L = length of a LIGO arm; λ = wavelength of GW)

$D_\lambda = D/\lambda$ (D = Straightline distance between two LIGO stations)

From the basic physics of waves, these conclusions follow:

(1). If $L_\lambda \lesssim 1/3$, LIGO cannot sense the polarization of GW (i.e., it is insensitive to the phase difference between X and Y).

(2). If $D_\lambda \lesssim 1/3$, LIGO cannot triangulate.

The factor 1/3 is rooted in the fundamental limitation that a wave cannot resolve structures smaller than about a third of the wavelength.

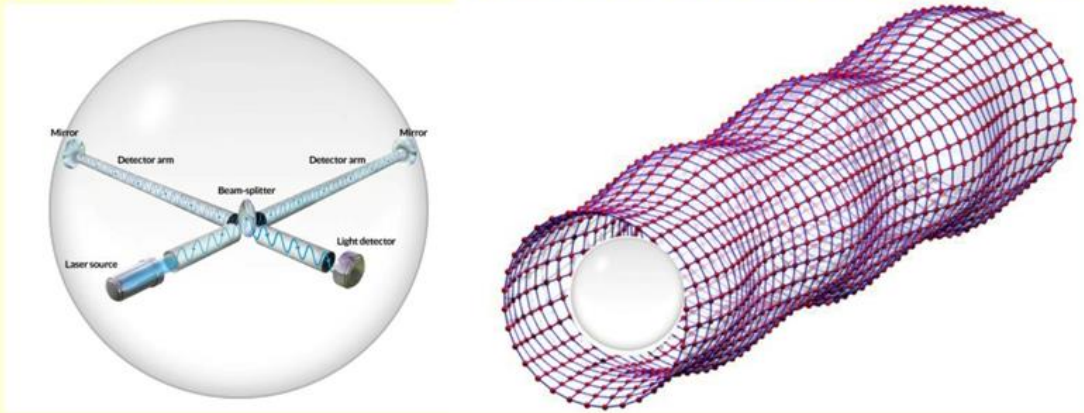
For LIGO application, both conditions $L_\lambda \lesssim 1/3$ and $D_\lambda \lesssim 1/3$ hold.

To say that a match of the theory wiggle and the observed wiggle constitutes the proof that the impetus is GW is to substitute science fiction for science. It is to require a presumptive story to complement an instrument of scientific discovery.

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A world education message from Bibhas De 02/16/2018

THE CORRECT LIGO DETECTION PHYSICS



The design of the L-shaped 2-D physical LIGO structure (in x-y plane, say) presupposes that its size d need not have any relationship to the wavelength λ of a GW in the z direction; that d is determined entirely by other criteria. But this L is not the detector. The actual detector is *a volume of space* defined by L. In the second figure, you can compare this volume (inset) with the manifest λ . The x, y, and z responses of the volume are inseparable. LIGO is totally subject to d -vs- λ limitations. If $d \ll \lambda$, the detector cannot sense any property of the GW, especially polarization. This is the case with LIGO, fatally so.

DUTY TO WARN

A world education message from Bibhas De 03/13/2019

LIGO WAVE DIGEST I

A wave is known first by its wavelength λ . In order to find any property (strength, direction vector \mathbf{k} , polarization) of the wave, a detector size d must be a substantial fraction of the wavelength. This is basic physics. There is also true for gravitational wave (GW).

Let's call the LIGO physical antenna L . It operates not as an external object placed in a wave field, but as an intrinsic part of space itself. It might as well be an imagined L for our discussion. The actual LIGO detector is not the 2D L , but a volume V of space that encloses L . And here's where the wavelength comes in. When d is a substantial fraction of λ (typically $d \geq 1/3 \lambda$), this volume can sense the properties of the wave. So L would undergo the differential length change due to polarization, as LIGO describes. But when $d \ll \lambda$, this volume V is just a dot in the path of the wave, and cannot sense the wave properties. L does not undergo the differential length change.

So the LIGO physical detector, with $d \ll \lambda$, cannot work off the polarization of the wave. Were its design principles otherwise correct (they are not) and GW existed, this detector might show some response to the wave, but only a qualitative one.

LIGO WAVE DIGEST II

Any suggestion that conventional wave physics limitations do not apply to LIGO should be dismissed out of hand.

Because of what has been said in PART I, in even an idealized (no noise etc.), sufficiently sensitive LIGO, a waveform incident on the detector will not be faithfully or quantitatively reproduced at the detector output. The observed output waveform cannot mimic the input waveform.

Therefore, one cannot directly compare a theoretically deduced waveform presumed to be incident, with the observed output waveform, as LIGO does. This process bypasses the crucial link: *The input waveform deduced from observed output waveform.* It is this input waveform that should be compared with the theory waveform.

The deep-sinking of this crucial link – whose determination is the whole true object of the \$1.1 billion experiment – is one of the multiple drop-dead *conceptual* faults of LIGO.

In conventional experiments, the two instrumental waveforms are related by the *instrument transfer function*. LIGO does not have one. LIGO cannot, did not, and will never observe gravitational wave.

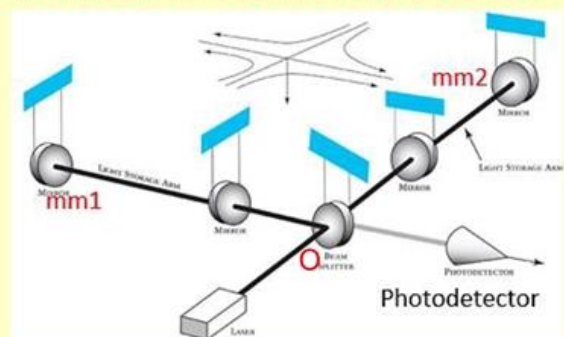
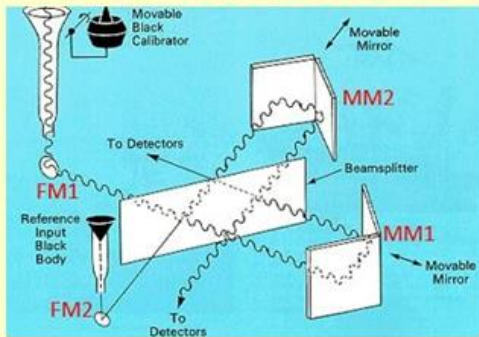
IV. "SPECIAL" RELATIVITY

The central applicable physics for LIGO instrument is General Relativity. Kip Thorne has been promoted as the world's leading expert on this subject. He has also averred that he has thought long about the instrument concept at length and depth, and concluded that it was sound.

However, LIGO dissidents have pointed out with total clarity that the GR principle applied to LIGO interferometry was wrong.

The *Laser Interferometer Gravitational Wave Observatory* never had anything to do with interferometry. →

LIGO WAS NEVER AN INTERFEROMETER



In the 1970s and 1980s, Rainer Weiss was applying his legendary instrument genius to two interferometers in parallel: COBE (left) and LIGO. Raister hatched a plan.

We normally do not think of it this way, but the very first need of an interferometer is a fixed frame of reference, as with COBE (the moving mirrors MM1 and MM2 are referenced to the fixed mirrors FM1 and FM2.) LIGO has no such frame, and the mirrors mm1 and mm2 and everything else are moving when the wave passes by. The wavelength of laser run is changing in concord, and so even though the runs O-mm1 and O-mm2 are of unequal lengths, no interferometric phase lag results. So Raister spins this narrative: Forget wavelength; since the speed of light is constant within LIGO (he says), when the runs recombine at the photodetector, they have had different travel times. This *time* lag, Raister says, shows up as a *phase* lag (and hey presto, we are back to conventional interferometry!) Now see the graphic below which says this narrative is wrong. There is no phase lag in LIGO. *Interferometry never applied.* We only have the reckless mess of Rainer Weiss, and we're out \$1.1 billion.

A world education message from Bibhas De 01/21/2019

Duty to Inform

OPPOSITE VIEWS ON LIGO LIGHT



Light always moves at the same, constant speed...when a gravitational wave passes through each arm, lengthening or shortening the arm, it also lengthens or shortens the wavelength of the light within it by a corresponding amount...This seems like a problem on the surface: If the light is lengthening or shortening as the arms lengthen or shorten, then the total interference pattern should remain unchanged as the wave passes through. ...But that's *not* how it works. ...What is important is the amount of time the light spends traveling through the arms!...When a gravitational wave passes through one of the arms, it changes the effective length of the arms, which therefore changes the amount of distance each laser beam needs to travel. One arm will lengthen, resulting in a longer light-travel time, while the other shortens, resulting in a shorter light-travel-time. As the relative arrival times change, we see an oscillatory pattern in how the reconstructed interference pattern shifts. – Ethan Siegel, blogger on *FORBES Magazine*



It is proved strictly based on general relativity that two important factors are neglected in LIGO experiments by using Michelson interferometers so that fatal mistakes were caused. One is that the gravitational wave changes the wavelength of light. Another is that light's speed is not a constant when gravitational waves exist. According to general relativity, gravitational wave affects spatial distance, so it also affects the wavelength of light synchronously. By considering this fact, the phase differences of lasers were invariable when gravitational waves passed through Michelson interferometers. In addition, when gravitational waves exist, the spatial part of metric changes but the time part of metric is unchanged. In this way, light's speed is not a constant. – Policarpo Yoshin Ulianov (Electrical and AI engineer) *et al*

ONE BILLION DOLLARS FOR THIS?!



The LIGO instrument operates strictly on the principle that while a gravitational wave is passing by, the speed c of the laser light remains a constant in that frame. In the following the authors explain with total clarity why this principle is wrong. Many others have explained many other fatal faults of LIGO. What no one can explain is why the Ligonauts are still peddling their wares and why governments are still buying their wares. May be a taxpayer can ask France Córdova (above) or Diane Souvaine or Anneila Sargent.

LIGO Experiments Cannot Detect Gravitational Waves by Using Laser Michelson Interferometers

—Light's Wavelength and Speed Change Simultaneously When Gravitational Waves Exist Which Make the Detections of Gravitational Waves Impossible for LIGO Experiments

Xiaochun Mei¹, Zhixun Huang², Policarpo Yōshin Ulianov³, Ping Yu⁴

Journal of Modern Physics, 2016, 7, 1749-1761

In the gravitational field, we have two definitions for ruler and clock, i.e., coordinate ruler and coordinate clock, as well as standard ruler and standard clock (or proper ruler and clock). Coordinate ruler and coordinate clock are fixed at a certain point of gravitational field. They vary with the strength of gravitational field. Standard ruler and standard clock are fixed on the local reference frame which falls free in gravitational field. In local reference frame, gravitational force is canceled, so standard ruler and standard clock are unchanged.

In LIGO experiments, observers are located at a gravitational field caused by gravitational wave, rather than falling free in gravitational field, so what they used were coordinate ruler and coordinate clock. Therefore, light's speed in LIGO experiments is not a constant.

01/23/2019



MEMORANDUM: LIGO INSTRUMENTATION FRAUD

Apportionment of blame

There is now a clear statement (01/09/2018) from Kip Thorne accepting full responsibility for the instrument. So he and Rainer Weiss are equally to blame for the quack instrument concept that made the fraudulent grand discoveries.

“TIMES OF INDIA: Were you always convinced about detections?”

Thorne: It's been a long journey, I began thinking about it about 50 years ago from a theoretical point of view, though it was 45 years ago when Rainer Weiss proposed the type of GW detectors we use in LIGO. It took me four years to get convinced that his design and idea has a serious chance to succeed, and once I was convinced I made a commitment to do everything to help him and his experimental colleagues to pull it off. I never had any serious doubts that this would succeed once I fully understood how this may work and the obstacles, and came to know the significant possibility to succeed.”

According to theory, a GW sets the two LIGO mirrors (~ 5.6 km apart) in *concerted* motion. Since LIGO can never measure the absolute motion of each mirror, this GW signature motion can never be observed. LIGO senses only *differential* motion of the two mirrors. If the mirrors were initially stationary (no other sources of motion), and the LIGO readout suddenly showed a wiggle similar to that calculated for the GW signature motion, this wiggle still would not prove that this motion is taking place. As an example, the wiggle could be due to just one mirror moving or tilting or jittering due to some unknown impetus local to that mirror. Thus even this textbook-ideal LIGO cannot detect GW on paper. Simultaneous signals at two or more stations, or demonstrating wiggle-matching cannot confirm the GW signature motion.




LIGO : GW :: Dowsing Rod : Water

01/16/2018

V. DEEP DISCONNECT

In all instruments of the LIGO type where there is an instrument input and an instrument output, one of these is measured and the other backed out from that measurement.

LIGO completely suppressed this procedure. There is no recognition anywhere of an instrumental input waveform. The output waveform, after removal of noise, is directly compared with the theoretically modeled waveform that is supposedly incident on LIGO.

Suppose an unknown source is predicted to emit Gaussian pulses . Suppose you have a telescope which, if it receives boxcar pulses  (input), reports Gaussian pulses  (output). Now, you deep-six the boxcar and just compare the Gaussians, and make the discovery. What's wrong with this?

There is a hidden disconnect between the theory and the observation.→

LIGO: AN AMICUS CURIAE BRIEF

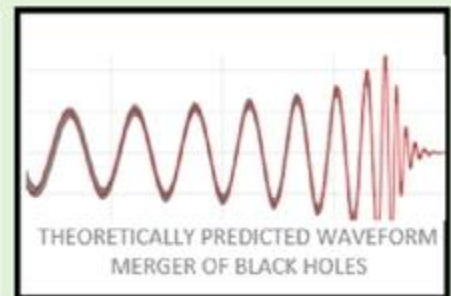
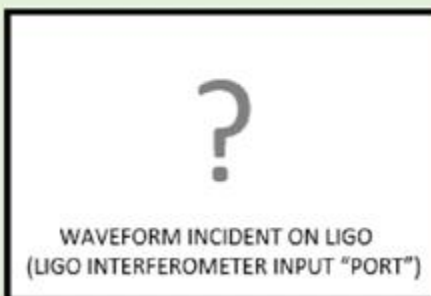
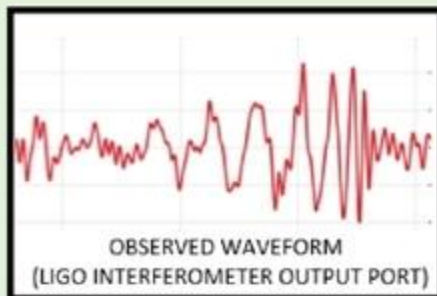
To: Kavli Astrophysics Prize Committee 2016

Physics Nobel Prize Committee 2017

Sub: Laser Interferometer Gravitational-wave Observatory's discovery

The LIGO instrument suffers from numerous scientific and engineering faults - many of them fatal. But here is a simplified sketch of one of the central stratagems behind the discovery of gravitational wave and black hole merger.

Most scientific instruments – as with LIGO – can be seen to have an input port and an output port. There is an input signal and an output signal. Generally, one of these is measured, and the other is inferred therefrom. The inferred signal then may be used to construct a theory or to test a preexisting theory.

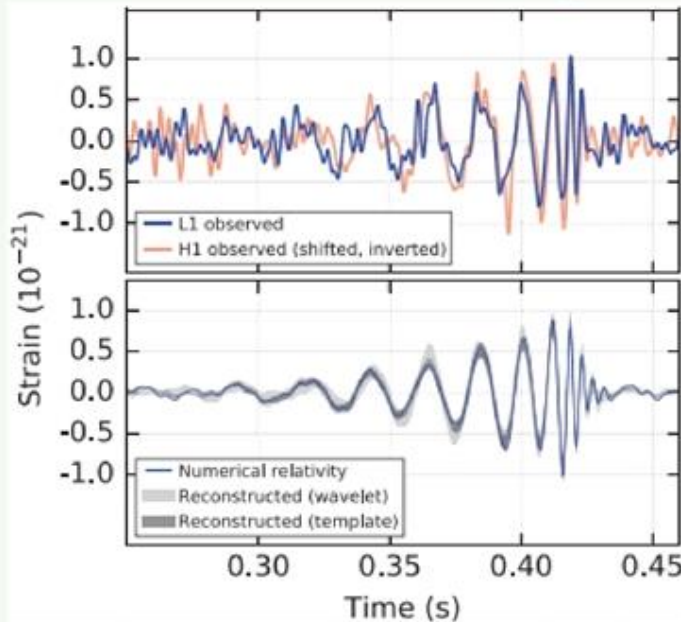


The LIGO output port signal is the observed waveform. LIGO input port signal is to be backed out from the observed signal using the *instrument transfer function*. For LIGO this function and therefore the input waveform are indeterminate. So the scientists simply slipped in in its place their theoretically predicted waveform which they tailored to match the observed waveform. The discovery followed. There was no cause-and-effect link between observation and theory.

There is no evidence that LIGO ever underwent a proper evaluation by professional engineers unconnected to the academia. *The Physical Review Letters* would not have conducted such a review before publishing the LIGO paper and thereby positing it as a discovery. This publication has no probative value whatsoever.

05/18/2016

LIGO NON SEQUITUR



This is the telltale LIGO discovery diagram, showing how the wiggle observed by Raister's machine (*top*) perfectly matches up with Kippyboy's intricate theory calculation (*bottom*). These dudes are the ultimate answer to the maiden's prayer! Or so we've been told.

Now I look at this and I tell myself: This is the ultimate non sequitur. There is absolutely no cause for the top panel to match the bottom panel! This is like putting your hand inside a shoe and finding a perfect fit. The top panel is the LIGO **output** waveform (the strain reported by LIGO). The bottom panel should match the LIGO **input** waveform (the strain incident on LIGO). And there is no way to get the LIGO input waveform because LIGO does not have an *Instrument Transfer Function*. Why not? Because LIGO is a worthless piece of crap from the beginning to the end. And so's the LIGO discovery. **Read my book there!**

A world education message from Bibhas De 07/27/2017

VI. QUANTUM CERTAINTY

LIGO mirror displacements are in the range of quantum uncertainty in length/velocity measurement. But it is averred that such displacements can be measured as macroscopic displacements and are meaningful classical physics quantities.

The LIGO calibrations procedure – such as it is – stays away from the above-mentioned displacement regime, being orders of magnitude larger. Thus all we have to substantiate what is said in the preceding paragraph is to accept that the Ligonauts' word.→

LIGO SCAMORAMA XIII

FROM THE DEPTHS OF UNCERTAINTY FLOW DEFINITIVE DISCOVERIES

In order to detect gravitational wave, LIGO has "to measure a motion 10,000 times *smaller* than an atomic nucleus (the smallest measurement *ever* attempted by science)..." So say Kip Thorne's groupies.



When a LIGO mirror moves in gravitational wave, let the uncertainty in its position be Δx .

Assuming that the Uncertainty Principle is applicable to this "motion" (If not, what is?), we have

$$\Delta x \Delta p \geq \hbar/2$$

We can write here the momentum uncertainty Δp as $m\Delta x/\tau$, where τ is the time period of the wave and m is the mass of the mirror. With $m = 40$ kg, $\tau \sim 10^{-2}$ sec, we get

$$\Delta x \geq 10^{-19} \text{ m}$$

The diameter of the atomic nucleus is $\sim 10^{-15}$ m. Thus the motion x LIGO has to measure is 10^{-19} m, in the same range as the uncertainty Δx in the mirror position. And from the bourn of this uncertainty would flow picture-perfect agreement between theory and measurement, phenomenal details about what happened billions of years ago and billions of light years away, and phenomenally snap decision in Sweden to award the Nobel Prize.

So it seems that Kip Baba's *Hare Krishnas* were measuring things that were fundamentally not measurable in physics, with a machine that was fundamentally a piece of crap.

Duty to Inform

A world education message from Bibhas De 11/16/2017

IS THE LIGO UNIVERSE A DOOZIE OR WHAT?!

The experimental data gathered by LIGO is in volts, from optoelectronic conversion. This means absolutely nothing until converted to length (meters). This is why LIGO calibration is *all-important*. Everything rests on it. The LIGO universe rests 100% on it. We could have fun with discussing the jury-rigged calibration set up, but it is not necessary to go there. Just consider:

Uncertainty in LIGO displacement measurement $\sim 10^{-19}$ m

Actual LIGO displacement measurement $\sim 10^{-19}$ m

Displacement for which LIGO is "calibrated" $\sim 10^{-16}$ m

So the calibration range is not only orders of magnitude clear of the measurement range (as Wolfgang Engelhardt alerted the Nobel Committee), it also cleanly avoids addressing LIGO's central falsehood that lengths in quantum uncertainty range can be measured as precision macroscopic lengths. LIGO strain data is raw sewage (as the Danes and Akhila Raman said in more polite language.) LIGO made discoveries?! Sure, a Nobel Prize says so.

Duty to Inform

A world education message from Bibhas De 12/09/2018

LIGO PHYSICS FOR YOUR KIDS III

OK kids, consider the signal-to-noise issue, assuming LIGO is a sound instrument. When a mirror moves along its axis, there are generally two causes: "displacement" x_{gw} due to the gravitational wave (GW), and X_n due to all kinds of noise. The net displacement is $X = x_{gw} + X_n$ (X 's and x 's can be + or -). Likewise, for the other mirror: $Y = y_{gw} + Y_n$. (with $y_{gw} = -x_{gw}$; X_n, Y_n are independent). The interferometer responds to $X - Y$. Now, we know that $x_{gw} \sim 10^{-19}$ m. But what is X_n ? To find the answer, consider what LIGO says:

In LIGO's suspensions, this process results in the magnitude of the vibrations that reach LIGO's critical 'test masses' being 100-million times smaller than the vibrations that 'shook' up the very top of the suspension system!

Here the test masses are the mirrors. Let's say magnitude here means the amplitude of vibration. So, if d is the amplitude of vibration of the LIGO support structure, then

$$X_n \sim 10^{-8} d \text{ m}$$

If however magnitude means the energy of vibration:

$$X_n \sim 10^{-4} d \text{ m}$$

The quantity d can be anything depending on its source (earth tremors, vehicles passing by, vibrations induced on LIGO by geomagnetic disturbances, etc.) Let's say d is as small as 1 μm . Then if magnitude means amplitude:

$$X_n \sim 10^{-14} \text{ m} \sim 10^5 x_{gw} \quad (\Rightarrow \text{GW Signal NOT detectable})$$

And if magnitude means energy:

$$X_n \sim 10^{-10} \text{ m} \sim 10^9 x_{gw} \quad (\Rightarrow \text{GW Signal NOT detectable})$$

\Rightarrow *Noise present*: GW cannot be detected. *Noise absent*: Since x_{gw} (after LIGO amplifies it 300-fold) $\sim 10^{-10} \lambda$ (λ = laser wavelength, $\sim 10^{-6}$ m), x_{gw} cannot be detected by the inteferometry technique. **Thus LIGO never responds to GW.**

VII. FAKING CHIRP

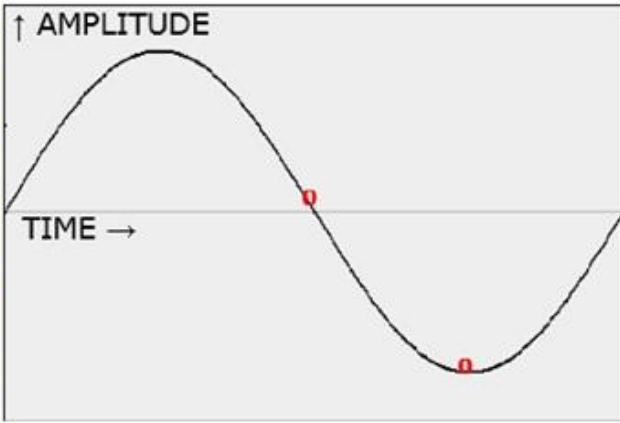
One of the most central and seemingly most convincing evidences in the LIGO discoveries is the chirp (or up-chirp) – a rise in frequency with time during the passage of the gravitational wave train.

The LIGO signal – even after it has been extracted from the noise – contains noise related frequencies. When this signal is converted to the frequency domain, there will be a whole range of frequencies. But not all of this range is on the sky. The highest frequency that is on the sky depends on the rate at which the laser samples the mirror positions during observation.

LIGO's higher end chirp frequencies reported exceed this maximum and are therefore not on the sky.→

LIGO SCAMORAMA IV

Let this be the time-amplitude diagram of a sine wave signal incident on LIGO. Since the amplitude as such is too small for LIGO to measure, it is accumulated 280 times by repeated probing of the mirror position with the laser beam. So these laser bounces give us an effective laser link length of 1120 km (4 km arm x 280 bounces). The light travel time for this link is 3.73 ms. Call this time Δt .



Now, theoretically, the maximum time τ to accumulate the amplitudes is a quarter cycle of the wave (as between the two red dots). For longer time spans, the graph will flip sign or direction within the time window τ , distorting the measured signal. By setting $\Delta t = \tau$, we find that the maximum frequency LIGO can measure is 67 Hz. In actuality, the maximum reliable frequency measurable by LIGO, f_{\max} , is much less than 67 Hz.

Of course LIGO does not measure a single sine wave. But whatever jagged time trace (signal + noise) it measures, it remains true that f_{\max} is the maximum signal frequency *measured*. This is a fundamental limitation, and cannot be overcome by any amount of digital processing of the readout.

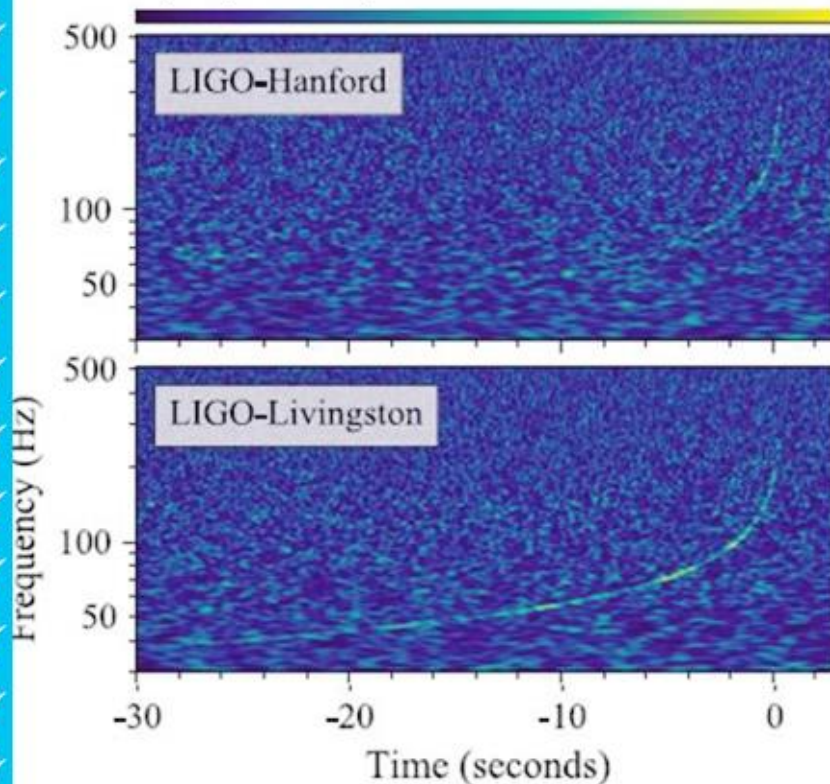
When the LIGO readout trace is converted to frequency domain, it can show frequency content up to hundreds of Hz. But nothing above f_{\max} pertains to the signal.

LIGO reports all kinds of frequency response bandwidths and on this basis, treats frequencies of hundreds of Hz (the region where LIGO chirps) as true measured signal frequencies. This is false. The LIGO chirps are not "on the sky."

LIGO FIFTH FRAUD

On 16 October 2017 the world learned that LIGO had observed gravitational wave chirp from spiraling binary neutron stars as they approached to the point of collision. Then the collision happened, and confirming this, a gamma ray burst was picked up by a satellite. During the next few days some 70 telescopes worldwide picked up the electromagnetic signature of the event.

Of this story, only the portion in green is correct. LIGO glommed on to the front end of this story with a very elaborate and highly deceptive ruse.



The LIGO time-trace recording technique imposes a fundamental limitation on the highest-frequency signal LIGO can faithfully report. This frequency f_{\max} is less than 67 Hz. Of course digital analysis of the LIGO readout can show frequency content up to hundreds of Hz, and Ligonauts can cite all kinds of frequency response bandwidths. But anything above f_{\max}

in the LIGO chirp diagram cannot be a signal faithfully recorded by the above technique. Anything below f_{\max} need not be gravitational wave. The chirp in the diagrams is not "on the sky".

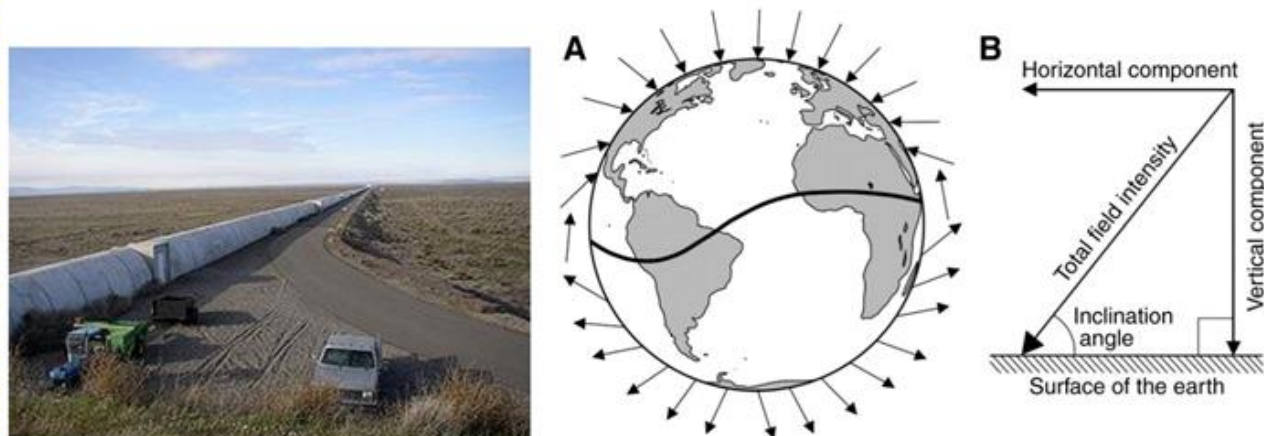
But this point is irrelevant. LIGO is not validated a scientific instrument for detecting gravitational wave, period.

ENGINEERING BOTCH-UP

Besides the fundamental conceptual errors described thus far, there are also practical issues of bad engineering. Here is one example. →

LIGO SCAMORAMA III

One of the most important considerations that needed to be considered decades ago while conceiving the LIGO instrument is the Earth's static magnetic field B which would wreak havoc on the instrument. Here's how:



LIGO's kilometers-long steel tubes are especially effective attractors of geomagnetic disturbances which induce time-varying electric currents I on the tube wall. As a result, a mechanical force proportional to $I \times B$ arises on the structure, causing it to mechanically vibrate. The tube as whole vibrates and along with it, everything mechanically connected to it vibrates.

Additionally, the geomagnetic disturbances penetrate inside the tube (no adequate shielding has been provide), and generate currents I in all metallic structures inside. Correspondingly, there is the force $\sim I \times B$ and the consequent jitter of the mirrors and the laser link.

While such vibrations are generally of no concern, they are of overwhelming importance in LIGO.

There is no evidence that the Ligonauts ever considered this effect in the four decades preceding their sham discovery, or in the two years following that discovery.

LIGO VIBRATION ISOLATION SYSTEM

A much-vaunted aspect of LIGO is their vibration isolation system. They have gloried over its engineering genius like you would not believe. You can see the copious use of metal: in the upper "Metal masses" section, and one or both of the reaction side masses. Geomagnetic disturbances of all types penetrate through the LIGO steel tube (examine the skin depth) and generate electric currents I in all metal structures inside. Since LIGO sits in Earth's static magnetic field B , all these structures vibrate due to the $I \times B$ force. These are not all forces on the overall LIGO structure that the mirror (Test mass) is to be isolated from, but *forces applied directly to the active*

components of the isolation chain itself. Therefore, no isolation of the mirror of the fantastic level claimed can be achieved. The neglect of the Earth's magnetic field, and of the skin depth effect is fatal to LIGO. But of course this is the least of LIGO's worries. This example just illustrates again how inept science was repeatedly passed off to the public as work of great genius. A world education message from Bibhas De 01/25/2019

Duty to Inform

